

11/30/17

"Remember no one can make you feel inferior without your consent." -Eleanor Roosevelt

HW: "Quadratic Inequalities" Practice #1-4

AIM: How do we solve Quadratic Inequalities?

Warm-up:

Solve for x: $4^{2x-3} = \left(\frac{1}{2}\right)^{3x}$

$$(4)^{2x-3} = (2)^{-3x}$$

$$(2)^{2x-3} = 2^{-3x}$$

$$\begin{array}{r} 4x-6 = -3x \\ +3x \qquad +3x \\ \hline 7x-6 = 0 \end{array}$$

$$\frac{7x}{7} = \frac{6}{7}$$

$$x = \frac{6}{7}$$

Write the solution set of each inequality in set builder, and interval notation.

1) $x^2 + 5x + 6 < 0$

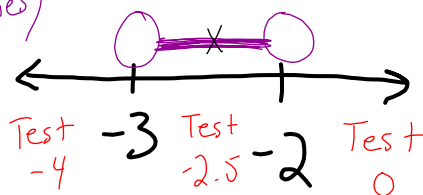
$$(x+2)(x+3)$$

$$x = -2 \quad | \quad x = -3$$

↑ ↑
critical values

$$< 0$$

open circles (negatives)



	-4	-2.5	0
$x+3$	-	+	+
$x+2$	-	-	+
$(x+3)(x+2)$	+	-	+

Set Builder: $\{x \mid -3 < x < -2\}$

Interval: $(-3, -2)$

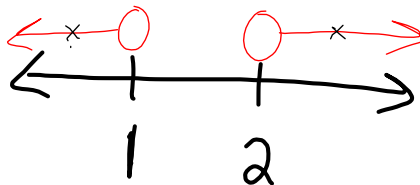
2) $x^2 - 3x + 2 > 0$

$$(x-2)(x-1)$$

$$x = 2 \quad | \quad x = 1$$

$$> 0$$


open circles
GO L I



S.B. = $\{x \mid x < 1 \text{ OR } 2 < x\}$

OR

Int: $(-\infty, 1) \cup (2, \infty)$

 (Not Included) means $<$ or $>$

[Included] means \leq or \geq

 When the squared term is POSITIVE

G - Greater than 0

O - Outside critical values

L - Less than 0

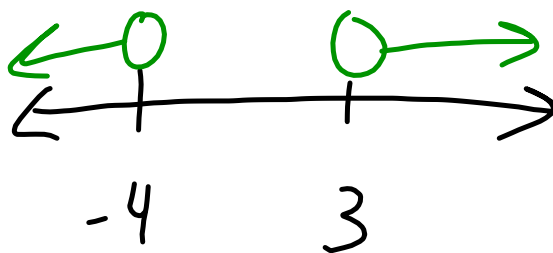
I - Inside the critical values

$-\infty$ or ∞ always get $()$

3) $x^2 > 12 - x$
 $-12+x \quad -12+x$

 $x^2 + x - 12 > 0$

open
GOLI



$$(x+4)(x-3) > 0$$

$$x = -4 \quad x = 3$$

$$\underline{SB}: \{x \mid x < -4 \text{ or } 3 < x\}$$

$$\underline{Int}: (-\infty, -4) \cup (3, \infty)$$

4) $x^2 \geq 2x$

Let's list the steps necessary to solve a quadratic inequality:

- 1) Get all terms to one side
(keep x^2 positive)
- 2) Factor
- 3) Find critical values
- 4) Complete the number line (Don't forget)
- 5) Express in the appropriate notation (set builder, interval)

60LT

HW Check:

$$1) \quad 2x + 24 - 2x^2 < 0$$

$$2(x + 12 - x^2) < 0$$

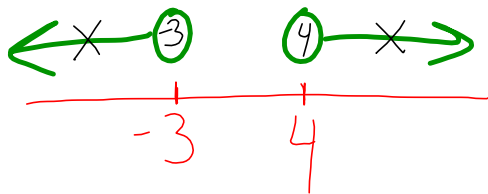
$$\frac{2(-x^2 + x + 12)}{2} < \frac{0}{2}$$

$$-1(-x^2 + x + 12 < 0) \quad \text{GO UP}$$

$$x^2 - x - 12 > 0$$

$$(x-4)(x+3)$$

4 -3



$$\begin{array}{r} x^2 - x + 12 < 0 \\ +x^2 - x - 12 \\ \hline 0 < x^2 - x - 12 \end{array}$$

SB: $\{x \mid x < -3 \text{ or } 4 < x\}$

Int: $(-\infty, -3) \cup (4, \infty)$

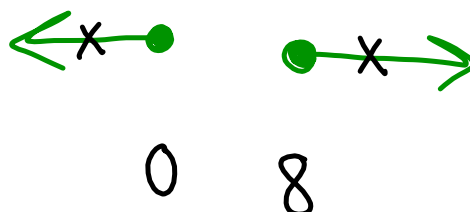
$$2) \quad 8x - x^2 \leq 0$$

$$\frac{-8x + x^2 \quad +x^2 - 8x}{\text{---}}$$

$$0 \leq x^2 - 8x$$

$$x^2 - 8x \geq 0 \quad \text{--- GO LI}$$

$$\begin{array}{c|c} x(x-8) & \\ \hline 0 & 8 \end{array}$$



$$\underline{SB}: \{x \mid x \leq 0 \text{ or } x \geq 8\}$$

$$\underline{Int}: (-\infty, 0] \cup [8, \infty)$$

$$3) \quad x^2 + 5x - 6 \geq 0 \rightarrow \text{GO LI}$$

$$(x+6)(x-1)$$

-6 1

$$\leftarrow 0 \quad 0 \rightarrow$$

-6 1

$$\text{SB: } \{x \mid x < -6 \text{ or } 1 < x\}$$

$$\underline{\text{Int:}} \quad (-\infty, -6) \cup (1, \infty)$$

$$4) \quad h^2 - 7h + 10 < 0 \quad \text{GO LI}$$

$$\begin{array}{cc} (h-5)(h-2) \\ 5 \quad 2 \end{array}$$

$$\begin{array}{ccc} 0 & \times & 0 \\ 2 & & 5 \end{array}$$

$$\underline{\text{SB:}} \{x \mid 2 < x < 5\}$$

$$\underline{\text{Int:}} (2, 5)$$

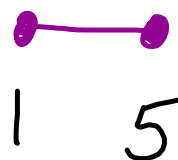
$$6) \quad x^2 \leq 6x - 5$$

$$\frac{-6x+5 \quad -6x+5}{}$$

$$x^2 - 6x + 5 \leq 0 \rightarrow \text{GOLI}$$

$$(x-5)(x-1)$$

$$5 \quad 1$$



$$\text{SB: } \{x \mid 1 \leq x \leq 5\}$$

HW:

#5, 7, 9

$$\text{Int: } [1, 5]$$